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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/780,433      | 02/12/2001  | Kou Ishizuka         | 35.G2741            | 8139             |

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| EXAMINER |
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SONG, HOON K

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| ART UNIT | PAPER NUMBER |
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2882

DATE MAILED: 09/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |                     |  |
|------------------------------|------------------------|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                              | 09/780,433             | ISHIZUKA, KOU       |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                              | Hoon Song              | 2882                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 03 June 2003.
- 2a) This action is FINAL.                  2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-24 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on 03 June 2003 is: a) approved b) disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### Attachment(s)

- |  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)           | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ . | 6) <input type="checkbox"/> Other: _____ .                                   |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukui et al. (US 5696373) in view of Kaneda et al. (US 5537210).

Regarding claim 1, Fukui teaches a grating interference encoder (figure 11) comprising

diffraction grating (22) for generating two diffracted light beams having different orders by being irradiated by a coherent light beam from an illuminating optical system; a grating (21) for deflecting the two diffracted light beams having the different orders generated from said diffraction grating to cause the deflected light beams to be re-projected onto said diffraction grating (figure 12a and 12b);

a photosensor; and

a beam splitter (8) for guiding a light beam, obtained by interfering the rediffracted light beams with each other, to said photosensor.

However Fukui fails to teach that the grating (22) is annular shape.

Kaneda teaches an annular shaped grating (figure 15).

In view of Kaneda, It would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to adopt the annular shape grating, since it

has been held to be within the general skill of a worker in the art to select a known shape of grating on the basis of its suitability for the intended use as a matter of obvious design choice. Further, such modification would have constituted an obvious engineering variation well within the ordinary skill in the art because changing the shape of the functionally equivalent element such as the grating would be within the inventor's experimental observation for intended use by applying existing mechanical variations such as shapes. While none of these is explicitly set forth, all of these are clearly within the level of ordinary skill in the art to use and would have been obvious to one of ordinary skill in the art to employ absent any showing of criticality based solely on design choice.

Regarding claim 2, Fukui teaches that said grating comprises a reflection diffraction grating (23).

Regarding claim 3, Fukui teaches that said grating is a transmission diffraction grating (see where first beam penetrate the annular grating), wherein diffracted light beams transmitted through and diffracted by said transmission diffraction grating are reflected by a reflecting optical element, and wherein twice diffracted light beams re-diffracted by said transmission diffraction grating are projected onto said diffraction grating (figure 11).

Regarding claim 4, Fukui teaches that said grating is local (figure 11).

Regarding claim 24, Fukui teaches a grating interference encoder comprising:

A diffraction grating (24) for generating two diffracted light beams (51a, 51b) having different orders (plus and minus) by being irradiated by a coherent light beam (1) from an illuminating optical system (figure 12a);

A grating (23) for deflecting the two diffracted light beams having the different orders generated from said diffraction grating to cause the deflected light beams to be reprojected onto said diffraction grating (figure 11, figure 12b); and

A photosensor (6) for receiving a light beam obtained by interfering the rediffracted light beams with each other.

However Fukui fails to teach that the grating (22) is annular shape.

Kaneda teaches an annular shaped grating (figure 15).

In view of Kaneda, It would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to adopt the annular shape grating, since it has been held to be within the general skill of a worker in the art to select a known shape of grating on the basis of its suitability for the intended use as a matter of obvious design choice. Further, such modification would have constituted an obvious engineering variation well within the ordinary skill in the art because changing the shape of the functionally equivalent element such as the grating would be within the inventor's experimental observation for intended use by applying existing mechanical variations such as shapes. While none of these is explicitly set forth, all of these are clearly within the level of ordinary skill in the art to use and would have been obvious to one of ordinary skill in the art to employ absent any showing of criticality based solely on design choice.

Regarding claims 5, 8-9, 12, 15, 18 and 21-23, Fukui teaches a grating interference encoder (figure 11) comprising:

diffraction grating for generating two diffracted light beams having different orders by being irradiated by a coherent light beam from an illuminating optical system (figure 12a);

an gating for deflecting the two diffracted light beams having the different orders generated from said diffraction grating to cause the deflected light beams to be re-projected onto said diffraction grating (figure 12b);

a beam splitter (8) for guiding a light beam, obtained by interfering the rediffracted light beams with each other, to said photosensor.

However Fukui fails to teach that the grating (22) is annular shape and fails to teach a condenser.

Kaneda teaches an annular shaped grating (figure 15) and the condenser.

In view of Kaneda, It would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to adopt the annular shape grating, since it has been held to be within the general skill of a worker in the art to select a known shape of grating on the basis of its suitability for the intended use as a matter of obvious design choice.. Further, such modification would have constituted an obvious engineering variation well within the ordinary skill in the art because changing the shape of the functionally equivalent element such as the grating would be within the inventor's experimental observation for intended use by applying existing mechanical variations such as shapes. While none of theses is explicitly set forth, all of these are clearly

within the level of ordinary skill in the art to use and would have been obvious to one of ordinary skill in the art to employ absent any showing of criticality based solely on design choice.

In view of Kaneda it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to adopt the condenser in order to linear beam is directed to a single rectangular pattern made of a reflection portion and a non reflection portion. Accordingly, one would be motivated to adopt the well known condenser in encoder art because it would provide resolution enhance process.

Regarding claims 6, 10, 13, 16 and 19, Fukui teaches that said grating comprises a reflection diffraction grating (23).

Regarding claims 7, 11, 14, 17 and 21, Fukui teaches that said grating is local (figure 11).

Regarding claim 20, Fukui teaches that said grating is a transmission diffraction grating, wherein diffracted light beams transmitted through and diffracted by said transmission diffraction grating are reflected by a reflecting optical element, and wherein twice diffracted light beams re-diffracted by said transmission diffraction grating are projected onto said diffraction grating.

#### ***Response to Arguments***

Applicant's arguments with respect to claims 1-24 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoon K Song whose telephone number is 703-308-2736. The examiner can normally be reached on 8:30 AM - 5 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on 703-305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are 703-746-4858 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



DAVID V. BRUCE  
PRIMARY EXAMINER

Hoon K. Song  
August 21, 2003